

REMARKS

In response to the above-identified Final Office Action ("Action"), Applicant traverses the Examiner's rejection to the claims and seeks reconsideration thereof. Claims 1-11 are now pending in the present application. In this response, no claims have been amended, no claims have been added and no claims have been cancelled.

I. Claim Rejections – 35 U.S.C. §103(a)

A. In the outstanding Action, Claims 1-4 and 7 are rejected under 35 U.S.C. §103(a) as being unpatentable over Mukai (U.S. Patent No. 6,815,242) ("Mukai"). Applicant respectfully traverses the rejection for at least the following reasons.

To establish a *prima facie* case of obviousness, the Examiner must show that the cited reference teaches or suggests each of the elements of a claim. Hindsight reconstruction may not be used to modify the reference to meet the claimed invention. MPEP §2145. Furthermore, the fact that the claimed invention is within the capabilities of one of ordinary skill in the art, without some showing of an objective reason for modifying the reference to arrive at the claimed invention, is not sufficient to establish a *prima facie* case of obviousness. *In re Kotzab*, 217 F.3d 1365, 1371, 55 USPQ2d 1313, 1318 (Fed. Cir. 2000).

The present invention is directed to a method of forming quantum dots, the method comprising an $\text{In}_x\text{Ga}_{1-x}\text{As}$ strained layer formed on a buffer layer and $\text{In}(\text{Ga})\text{As}$ quantum dots formed on the $\text{In}_x\text{Ga}_{1-x}\text{As}$ strained layer.

In regard to independent Claim 1, Applicant respectfully submits Mukai fails to teach or suggest at least the element of an " $\text{In}_x\text{Ga}_{1-x}\text{As}$ strained layer formed on a buffer layer." Mukai teaches a method of manufacturing a semiconductor device with quantum dots. The Examiner alleges Mukai teaches an $\text{In}_x\text{Ga}_{1-x}\text{As}$ layer (136) formed on a buffer layer (132/134)(col. 17, lines 15-55 and Fig. 19A-19C) and suggests that although Mukai fails to teach the use of a strained layer, this element would have been

well known in the art. See Action, page 2. Applicant respectfully disagrees with the Examiner.

The Examiner's reliance on what was "known in the art" to teach an $\text{In}_x\text{Ga}_{1-x}\text{As}$ strained layer without evidentiary support as the principal evidence upon which the rejection is based is inappropriate, particularly as is the case here, where the application is under a final rejection. See MPEP §2144.03(A), citing *In re Zurko*, 258 F.3d 1379, 1385 (Fed. Cir. 2001), see also, *In re Ahlert*, 424 F.2d 1088, 1091, 165 USPQ 418, 420-421 (CCPA 1973)(noting it would not be appropriate for the Examiner to take official notice of facts without citing a prior art reference where the facts asserted to be well known are not capable of instant and unquestionable demonstration as being well-known). Mukai fails to even contemplate or discuss the use of a strained layer. Moreover, Mukai fails to teach a process for forming a strained layer to achieve shifting of the quantum dots to the desired longer wavelength. Accordingly, it is not instantly apparent that the $\text{In}_x\text{Ga}_{1-x}\text{As}$ layer formed on the n-GaAs substrate layer could be used as a strained layer. If the Examiner chooses to maintain this position, Applicant respectfully requests that the Examiner provide supporting documentary evidence showing the facts asserted are "well known." Accordingly, the Examiner has failed to point to, and Applicant is unable to discern, a portion of Mukai teaching or suggesting at least the element of an $\text{In}_x\text{Ga}_{1-x}\text{As}$ strained layer formed on a buffer layer. The Examiner has further failed to show this element is "well known" thus a *prima facie* case of obviousness may not be established. For at least the foregoing reasons, Applicant respectfully requests withdrawal of the rejection of Claim 1 under 35 U.S.C. §103(a).

In regard to Claims 2-4 and 7, these claims depend from Claim 1 and incorporate the limitations thereof. Thus for at least the reasons discussed above in regard to Claim 1, a *prima facie* case of obviousness has not been established with respect to Claims 2-4 and 7. For at least the foregoing reasons, Applicant respectfully requests withdrawal of the rejection of Claims 2-4 and 7 under 35 U.S.C. §103(a).

B. In the outstanding Action, Claims 5 and 6 are rejected under 35 U.S.C. §103(a) as being unpatentable over Mukai in view of Petroff et al (U.S. Patent No. 5,614,435)

("Petroff"). Applicant respectfully traverses the rejection for at least the following reasons.

Claims 5 and 6 depend from Claim 1 and incorporate the limitations thereof. Thus, for at least the reasons discussed above in regard to Claim 1, Mukai fails to teach or suggest at least the element of "an $\text{In}_x\text{Ga}_{1-x}\text{As}$ strained layer formed on a buffer layer" and the Examiner has failed to show such element is "well known." Moreover, the Examiner has not pointed to, and Applicant is unable to discern any portion of Petroff teaching this element. Thus, Claims 5 and 6 are not *prima facie* obvious over Mukai in view of Petroff. For at least the foregoing reasons, Applicant respectfully requests withdrawal of the rejection of Claims 5 and 6 under 35 U.S.C. §103(a).

C. In the outstanding Action, Claims 8-11 are rejected under 35 U.S.C. §103(a) as being unpatentable over Mukai in view of U.S. Patent No. 6,885,023 issued to Shields et. al. ("Shields"). Applicant respectfully traverses the rejection for at least the following reasons.

In regard to Claim 8, Mukai fails to teach or suggest at least the elements of forming a lattice-matched buffer layer on an InP substrate, forming an $\text{In}_x\text{Ga}_{1-x}\text{As}$ strained layer on the lattice-matched buffer layer, wherein the $\text{In}_x\text{Ga}_{1-x}\text{As}$ strained layer changes the surface structure of the lattice-matched buffer layer and alters a strain energy that is necessary to grow the In(Ga)As quantum dots. The Examiner admits Mukai fails to teach or suggest an InP substrate and instead relies upon Shields to teach this element. See Action, page 5. The Examiner further admits Mukai fails to teach a strained layer formed on a buffer layer and a lattice-matched buffer layer, wherein the $\text{In}_x\text{Ga}_{1-x}\text{As}$ strained layer changes the surface structure of the lattice-matched buffer layer and alters a strain energy that is necessary to grow the In(Ga)As quantum dots and instead alleges these elements were well know in the art. See Action, page 5.

In regard to the InP substrate, the Examiner alleges Shields teaches an InP substrate provides a better matching between an upper InAlAs buffer layer and the InP substrate. See Action, page 5. On this basis the Examiner concludes one of ordinary skill in the art would be motivated to make the relied upon combination. Mukai,

however, does not teach an upper InAlAs buffer layer. Accordingly, one of ordinary skill in the art would not recognize the teachings of Shields to provide any particular advantage to the buffer layer taught by Mukai. Thus, it is only upon viewing the teachings of Applicant's disclosure that the advantages of forming a lattice-matched buffer layer on an InP substrate would be recognized. As the Examiner is no doubt aware, such hindsight reconstruction is entirely inappropriate in combining references to render a claim obvious. Accordingly, the Examiner has failed to show this element is obvious over Mukai in view of Shields.

Moreover, in regard to the $\text{In}_x\text{Ga}_{1-x}\text{As}$ strained layer and a lattice-matched buffer layer, wherein the $\text{In}_x\text{Ga}_{1-x}\text{As}$ strained layer changes the surface structure of the lattice-matched buffer layer and alters a strain energy that is necessary to grow the In(Ga)As quantum dots, for at least the reasons previously discussed the Examiner has failed to provide sufficient support for the assertion that these elements are well-known in the art. Moreover, the Examiner has not pointed to a portion of Shields teaching these elements. Accordingly, neither Mukai nor Shields, alone or in combination, teach or suggest these additional elements of Claim 8. For at least the foregoing reasons, Claim 8 is not *prima facie* obvious over Mukai.

In regard to Claims 9-11, Claims 9-11 depend from Claim 8 and incorporate the limitations thereof. Thus, for at least the reasons discussed above in regard to Claim 8, Claims 9-11 are not *prima facie* obvious over Mukai in view of Shields.

CONCLUSION

In view of the foregoing, it is believed that all claims now pending, namely Claims 1- 11, are now in condition for allowance and such action is earnestly solicited at the earliest possible date. If there are any additional fees due in connection with the filing of this response, please charge those fees to our Deposit Account No. 02-2666. Questions regarding this matter should be directed to the undersigned at (310) 207-3800.

Respectfully submitted,

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Dated: December 9, 2005

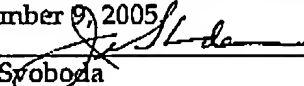
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CERTIFICATE OF FACSIMILE

I hereby certify that this correspondence is being transmitted via facsimile No. (571)273-8300 to: Mail Stop AF, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on December 9, 2005.


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